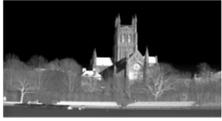


Thursday 26<sup>th</sup> September 2019

WORCESTER • University of Worcester, EEG089

- John Gillham, Malvern Radar & Technology History Soc<sup>y</sup>

## Somewhere Under the Rainbow



Rainbows have been observed with wonder for thousands of years, but there are even more wonders beyond the colours that we can see. This talk describes how we found out about one of

these wonders, the Infrared, and what it can show us about ourselves and the world around us. There are even local connections to some of the most important work on detecting Infrared energy that will be included.

Monday 7<sup>th</sup> October 2019

MALVERN • Malvern College, Lewis Lecture Theatre  
**Malvern Festival of Innovation Launch Lecture.** 7:00pm

- Marcus Chown, Writer & Broadcaster

## Bonkers Things About the Universe

For details and to register see [www.festival-innovation.com](http://www.festival-innovation.com)

Wednesday 23<sup>rd</sup> October 2019

WORCESTER • University of Worcester, EEG089

- Dr Graham Smith, Reader of Cosmology, School of Physics & Astronomy, University of Birmingham

## The Large Synoptic Survey Telescope



The Large Synoptic Survey Telescope (LSST) will survey the entire Southern sky for ten years starting in 2022, building up a decade-long movie of the night sky. LSST will revolutionize our understanding of the cosmos from stars and planets through to the expansion of the universe and tests of fundamental physics. Dr Smith will give an overview of this extraordinary machine and highlight some of the most exciting science that we hope to achieve with LSST.

Thursday 7<sup>th</sup> November 2019

25<sup>th</sup> Annual Public Science Lecture, Huntingdon Hall.

- Professor Alan Davies, School of Physics, Astronomy and Mathematics, University of Hertfordshire

## Soap Films and Bubbles



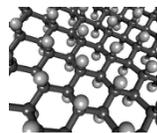
We are all familiar with soap bubbles. But how are they formed? Why are they spherical? What causes the beautiful colours that shimmer in a bubble? To answer these questions, we shall start by describing how soap films form and how they produce bubbles. We shall describe the properties and the structure of films, both static and when they vibrate. The talk will include a variety of practical problems including how soap films may be used to solve problems such as the routing of underground pipes and power lines.

Thursday 12<sup>th</sup> December 2019

WORCESTER • University of Worcester, EEG089

- Professor Vladimir Falko, Professor of Theoretical Physics, Director of the National Graphene Institute, University of Manchester

## New and Old Physics in Heterostructures of Two-dimensional Materials



The advent of two-dimensional materials, started by the discovery of graphene, has opened a new trend in materials science: the intelligent design of heterostructures combining different, atomically thin, layers into new crystals with properties not found in nature. The lecture will overview the extremes of physics enabled by such 'atomic Lego' and a variety of optoelectronic applications.

Thursday 9<sup>th</sup> January 2020 *Joint with Worcs Astro Soc<sup>y</sup>*

WORCESTER • University of Worcester, EEG089

- Professor Carl Murray, Professor of Mathematics and Astronomy, School of Physics and Astronomy, Queen Mary University of London

## Cassini at Saturn – the End of an Era



The Cassini spacecraft orbited the ringed planet Saturn for 13 years before ending its mission in September 2017 by plunging into the planet's atmosphere. This talk will highlight some of Cassini's remarkable observations, including the discovery of plumes of ice particles emanating from a source of liquid water beneath the moon Enceladus. The last part of the talk will focus on Cassini's discoveries about the planet's vast ring system.

Thursday 13<sup>th</sup> February 2020 *Joint with* **IET**

HEREFORD • Hereford University Centre

- Professor David J Beerling, FRS. Director, Leverhulme Centre for Climate Change Mitigation, Department of Animal & Plant Sciences, University of Sheffield

## Farming with Rocks to combat Climate Change



Professor Beerling is the founder and Director of the Leverhulme Centre for Climate Change Mitigation, a premier international Centre for carbon dioxide removal. He will tell us how we can use the mining industry's waste to improve agriculture, boost yields, capture CO<sub>2</sub> from the air and reduce harmful NO<sub>2</sub> emissions. Win, Win, Win, Win!

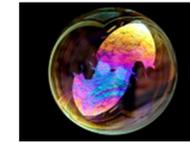
**For Huntingdon Hall: admission is only by ticket.  
These are free from the Box Office from 1<sup>st</sup> Sept.**

Tuesday 10<sup>th</sup> March 2020

British Science Week

MALVERN • Malvern St James School

- Professor Roy Sambles, FRS. *Past President of IOP*
- ## Wave-Particle Duality and the Frightening Consequences



Three of the greatest Western scientists were distracted by the question 'What exactly is light?' Newton rhetorically suggested that rays of light were 'very small bodies emitted from shining substances'. Young, with his double slit experiment, provided convincing proof of the wave characteristic of light. Then Einstein, by explaining the photoelectric effect, developed a quantum theory of light. But who is actually correct? All are! This demonstration lecture will explore some of the disturbing aspects of wave-particle duality.

Thursday 2<sup>nd</sup> April 2020

WORCESTER • University of Worcester, EEG089

- Professor Julia Gog, Professor of Mathematical Biology, University of Cambridge

## Maths vs Disease



How can mathematics help prevent and mitigate epidemics and pandemics? In this talk, we will see some current research going on in infectious disease dynamics, to understand how influenza works and how it might spread in future pandemics.

Thursday 7<sup>th</sup> May 2020

WORCESTER • University of Worcester, EEG089

- David Wilkinson, Institute of Physics and Fellow, Nottingham Trent University.

## To c or not to c - Physics in Science Fiction Writing



Science fiction has long been divided between authors who try to get all the physics right and those who abandon any pretence at considering real-world science at all. This lecture looks at some of those who tried and considers both how well they did and the innovative ideas they have come up with for future physics and technology. And of course, there is the perennial question in space-based future fiction – whether faster-than-light travel is permitted. To have >c or <c? That is the question...

**All lectures start at 7:30pm (except for 7<sup>th</sup> October). We finish by 9:00pm.**

**Tuesday 8<sup>th</sup> October 2019**

MALVERN • Three Counties Showground.

(See: [www.festival-innovation.com](http://www.festival-innovation.com))**Next Generation Innovators***Sponsored by IOP*

This is a science fair for Years 7 to 9 pupils. There will be hands-on workshops, exhibits and lectures. (*Registration required. School parties & Home Educators only.*)

**Monday to Saturday 7<sup>th</sup> - 12<sup>th</sup> October 2019**

MALVERN • Malvern Theatres (See website above)

**Malvern Festival of Innovation**

Today we need to innovate more than ever: the way we do business, the way we use resources; the way we live. We need new ideas to stay competitive, new technologies to improve lives, and new insights to lead the way. Join us to discover what's coming next and to learn how others are innovating.

**Including ...**

**12<sup>th</sup> October, the Family Day:** Be enlightened and inspired by the Family Show speakers and explore the hands-on exhibits staged in the Malvern Theatres.

**For adults, parents and children:****Saturday 5<sup>th</sup> October 2019**

WORCESTER • The Hive

Space Day 11.00-16.00

**Saturday 27<sup>th</sup> June 2020**MALVERN • Priory Park (*bring a picnic!*)**Science in the Park***Sponsored by IOP*

Join us for a fun and exciting day exploring the wonders of science and technology. Outdoor activities for all the family.

**Venues**

**Hereford University Centre**, Herefordshire and Ludlow College, Folly Lane, Hereford. HR1 1LS.

**Huntingdon Hall**, Worcester. WR1 3LD.

Box Office: 01905 611427

**Malvern College**, Lewis Lecture Theatre, College Road, Malvern. WR14 3DF.

**Malvern St James**, Avenue Road, Malvern. WR14 3BA.

**Malvern Theatres**, Grange Road, Malvern. WR14 3HB.

**The Hive**, Sawmill Walk, The Butts, Worcester. WR1 3PD.

**Three Counties Showground**, Malvern. WR13 6NW.

**University of Worcester**, St Johns Campus,

Worcester. WR2 6AJ. (*Go to Reception in Edward Elgar bldg*)

The **Institute of Physics** is a leading international professional body and learned society, established to promote the advancement and dissemination of physics.

The Institute has a world-wide membership and has a major international presence in:

- scientific publishing and electronic dissemination of physics;
- setting professional standards for physicists and awarding professional qualifications;
- promoting physics through scientific conferences, education and science;
- policy advice.

Details about the various grades of membership and of professional qualifications can be found at

<http://www.iop.org/membership/>

Undergraduates, Trainees and Apprentices can join the IoP as Associate Member.

**For further information**

Institute of Physics - Hereford and Worcester Centre:

**J E Beale**

07801365204

[john.beale@physics.org](mailto:john.beale@physics.org)**Dr A C Smith**

01684 569503

[alancsmith@physics.org](mailto:alancsmith@physics.org)

If you have an idea for a topic that you would like to hear about then please get in touch.

**Follow us on Twitter @iophwc**

**To be included on our mailing list:**

Please e-mail: [engagement@iop.org](mailto:engagement@iop.org)

and ask to be included on the **H&W Event email list**

**Image credits**

LSST: LSST Corporation

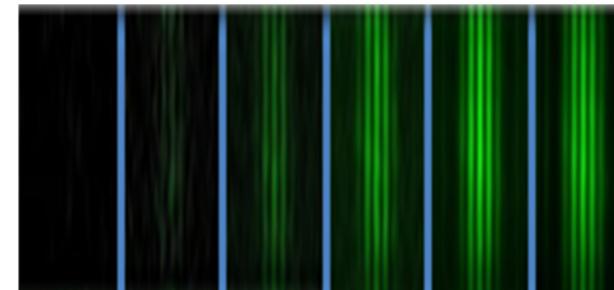
Soap films: Wikipedia CC BY-SA 3.0

Graphane: Wiki Commons Edgar181 [Public domain]

Cassini at Saturn: NASA/JPL-Caltech/SSI

Farming: Ilsa Kantola (Univ<sup>y</sup> of Illinois, Champaign-Urbana)

All other images courtesy of the speakers.

**Hereford & Worcester Events****Lectures & Outreach  
2019/2020****Wave-Particle Duality**

Why do particles behave as waves?  
Why do waves behave as particles?  
The British Science Week lecture will explore some of the surprising aspects of wave-particle duality.

**Admission free!**